

SOME DETAILS OF THE STRUCTURE OF
RHODOTHAMNUS CHAMAECISTUS

HERBERT F. COPELAND

With one plate

THIS NOTE is a supplement to my paper (1943) on the genera of the subfamily Rhododendroideae of the family Ericaceae. In that paper, the genus *Kalmiopsis* Rehder (1932) was suppressed: its only species, *K. Leachiana* (Henderson) Rehder, an undershrub local on certain summits in southwestern Oregon, was transferred to *Rhodothamnus*. This was done without original study of the only previously recognized species of *Rhodothamnus*. The latter, *R. Chamaecistus* (L.) Reichenbach, is local on the Alps; under the conditions of the times, it had been impossible to obtain material of it. As soon as communication between Germany and America again became feasible, Dr. Hermann Sleumer had the kindness to send material of *R. Chamaecistus* fixed for histological study. The material is from cultivated plants *ex Museo botanico Berolinensi*, and was collected during and just after flowering, in April and May, 1948. It has been subjected to the remaining steps of routine microtechnique and duly studied. The results permit further discussion of relationships between *Kalmiopsis* and *Rhodothamnus*.

Rhodothamnus Chamaecistus is an undershrub with crowded small thick alternate leaves. In spring, it produces a few flowers on long pedicels arising from between pairs of bracteoles in the axils of leaves near the tip of the stem. The growth of the vegetative shoots of the year, terminal and axillary, begins at about the same time.

The flowers (*fig. b*) have five narrowly triangular sepals; a pink corolla with a brief tube and a rotate limb, 5-lobed, with deep sinuses; ten long-exserted stamens; a depressed-globular ovary with five locules opposite the lobes of the corolla; and a long style springing from a depression in the summit of the ovary, the stigma not expanded. The flower is slightly zygomorphic; the median petal is on the lower or abaxial side. The sepalad stamens are of greater average length than the petalad stamens, the longest stamens of both whorls being on the adaxial side. The anthers (*fig. c*) are elongate. The two terminal "pores" of each anther are actually brief slits which gape widely at maturity.

The leaves, but not the bracteoles, are ciliate with stout gland-tipped bristles. Stems, pedicels, and calyces are beset with similar bristles. There are simple hairs on stems, pedicels, ovaries, and the bases of the filaments.

The stems are of the same internal structure as those of other Rhododendroideae, being of the type which lack a cylinder of fibers of pericycle.

The leaves reach a width of about 3 mm. and are about 300 μ thick

(*fig. a*). The epidermis is of large cells with a thick cuticle; the cells are larger, and the cuticle is thicker, on the upper side. The stomata are confined to the lower epidermis and open at the level of the outer surface. The guard cells bear a ridge at the outer opening of the stomatal passage, but not at the inner opening. There are two or three layers of palisade cells occupying about half of the thickness of the leaf. The veins are not joined to the epidermis by flanges of differentiated tissue; they are imbedded between palisade and spongy tissue. Each vein contains a conspicuous strand of fibers between the xylem and phloem.

The base of the floral receptacle is impressed. The ten main perianth bundles which arise from the stele in this region (*fig. d*) are recurved at their origin. Theoretically, these bundles are two whorls, but all arise at approximately the same level. Five of them are the median bundles of sepals. The five which alternate with these undergo forking, each into three; the middle branch forks again and supplies a lobe of the corolla; the lateral branches are the lateral bundles of the adjacent sepals. There are occasional deviations from the typical pattern thus described. The ten stamen bundles arise from the upper sides of the main perianth bundles. The vascular tissue which continues beyond the departure of the main perianth bundles forms for the most part five bundles, fused pairs of ventral bundles of adjacent carpels, which ascend the central column of the ovary in the planes of the septa to about half the height of the ovary. Each of them divides into two branches which run out into placentae in adjacent locules. From the bases of the perianth bundles and the carpel ventrals small bundles originate, in no evident pattern, and run out into the ovary wall. Some distance above the base of the ovary, five of these small bundles become recognizable, by their course in the median planes of the carpels, as carpel dorsals. The other small bundles fade out; the carpel dorsals ascend the ovary wall to its summit, dip under the depression about the base of the ovary, and ascend the style.

The internal structure of the ovary, the moderately elongate ovule (*fig. e*), and the embryo sac are quite as in other *Rhododendroideae*.

Nearly all of the observed characters of *Rhododhamnus Chamaecistus* are those which are to be expected of a plant included in subfamily *Rhododendroideae* and tribe *Phyllodoceae*. Zygomorphy is somewhat more evident in the flowers of this plant than in those of other members of the tribe, and the rotate corolla with deep sinuses is exceptional. The anthers and the vascular system in the receptacle are quite as in *Kalmiopsis Leachiana*, *Kalmia*, and *Phyllodoce*. The anatomy of the leaves is essentially exactly as in *Kalmiopsis Leachiana*: Breitfeld (1888) was mistaken (so far as the available material shows) in describing the epidermal cells as small and the veins as "*durchgehend*." *Kalmiopsis Leachiana* remains different from *Rhododhamnus Chamaecistus* in its larger leaves, its more extensive inflorescence, its shallowly indented campanulate corolla, and particularly in its peculiar scales, which simulate those of *Rhododendron* and *Ledum* while not being of the same structure.

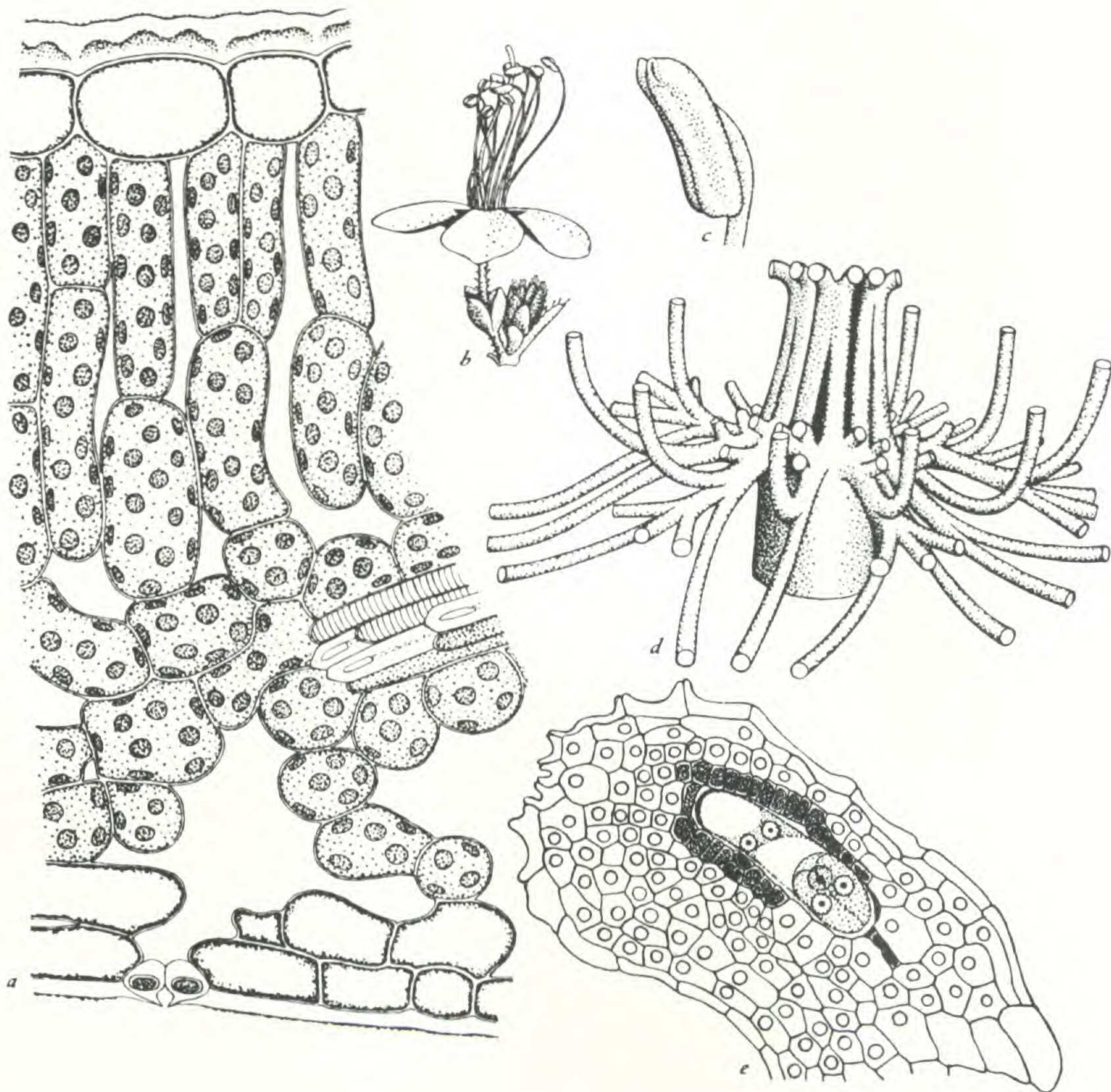
Judgment as to the expedient limits of taxonomic groups is often in-

escapably subjective. To such judgment it appears, more definitely than before, that *Kalmiopsis* is not to be maintained as a genus. The plant of southwestern Oregon is to be called *Rhodothamnus Leachianus*. As represented by the two species here ascribed to it, *Rhodothamnus* is indeed a remarkable example of interrupted distribution.

LITERATURE CITED

1. BREITFELD, A. Der anatomische Bau der Blätter der Rhododendroideae in Beziehung zu ihrer systematischen Gruppierung und zur geographischen Verbreitung. Engler's Bot. Jahrb. 9: 319-379. 1888.
2. COPELAND, H. F. A study, anatomical and taxonomic, of the genera of Rhododendroideae. American Midl. Nat. 30: 533-625. 1943.
3. REHDER, A. *Kalmiopsis*, a new genus of Ericaceae from northwest America. Jour. Arnold Arb. 13: 30-34. 1932.

SACRAMENTO JUNIOR COLLEGE
SACRAMENTO, CALIFORNIA



RHODOTHAMNUS CHAMAECISTUS (L.) Reichenbach

RHODOTHAMNUS CHAMAECISTUS. a, cross section of leaf $\times 320$. b, flower $\times 1.6$. c, anther $\times 8$. d, vascular system in the floral receptacle $\times 40$. e, ovule $\times 320$.